

# Analog Devices Welcomes Hittite Microwave Corporation

NO CONTENT ON THE ATTACHED DOCUMENT HAS CHANGED



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### Typical Applications

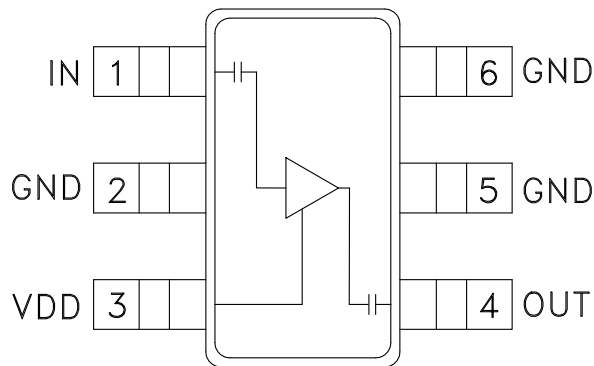
The HMC286 / HMC286E is ideal for:

- BlueTooth
- Home RF
- 802.11 WLAN Radios
- PCMCIA Platforms

### Features

- 2.4 GHz LNA
- Noise Figure: 1.7 dB
- Gain: 19 dB
- Single Supply: +3V
- No External Components
- Ultra Small SOT26 Package

### Functional Diagram



### General Description

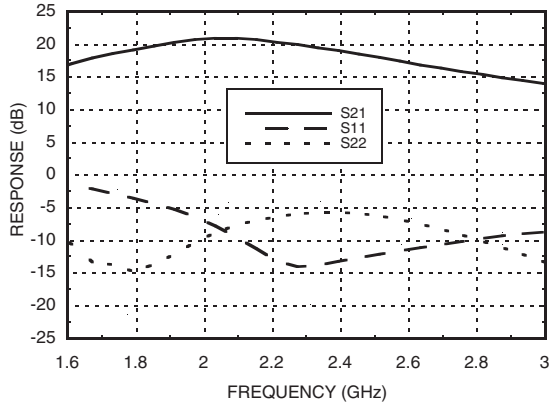
The HMC286 & HMC286E are low cost Low Noise Amplifiers (LNA) for 2.3 to 2.5 GHz spread spectrum applications. The LNA provides 19 dB of gain and a 1.7 dB noise figure from a single positive +3V power supply that consumes only 8.5mA. The typical output 1 dB compression point is +6 dBm at 2.4 GHz. The compact LNA design utilizes on-chip matching for repeatable gain and noise figure performance. In addition, eliminating the external matching circuitry also reduces the overall size of the LNA function. The HMC286 & HMC286E were designed to meet the size constraints of PCMCIA platforms and uses the SOT26 package that occupies 0.118" x 0.118", which makes them a small fully integrated solution that can be easily implemented with other 2.4 GHz ASICs.

### Electrical Specifications, $T_A = +25^\circ\text{C}$ , $V_{dd} = +3V$

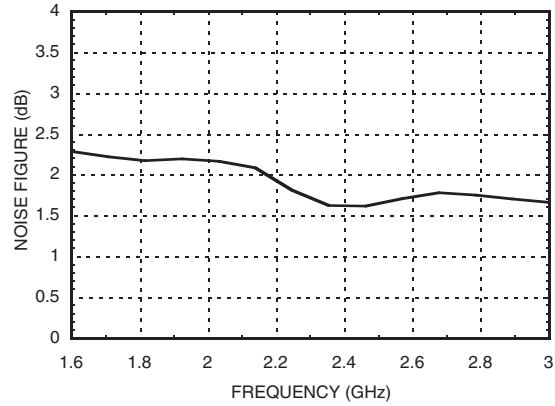
Parameter	Min.	Typ.	Max.	Units
Frequency Range	2.3 - 2.5			GHz
Gain	16	19		dB
Gain Variation Over Temperature		0.015	0.03	dB/°C
Gain Flatness		±1.25		dB
Noise Figure		1.7	2.5	dB
Input Return Loss		12		dB
Output Return Loss		4.5		dB
Output 1 dB Compression (P1dB)	2	6		dBm
Output Third Order Intercept (IP3)	9	12		dBm
Supply Current (I <sub>dd</sub> )		8.5	12.5	mA



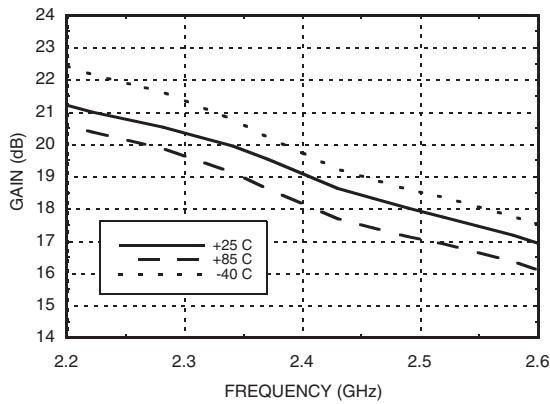
**Broadband Gain & Return Loss**



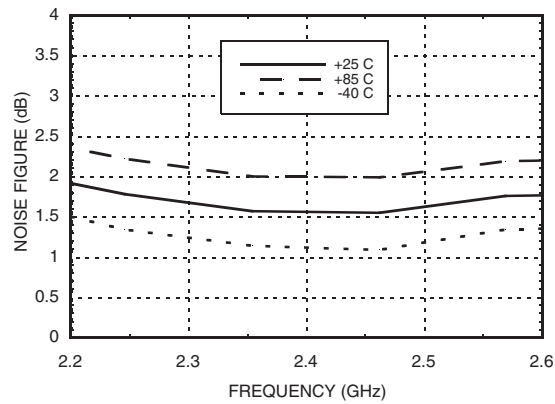
**Broadband Noise Figure**



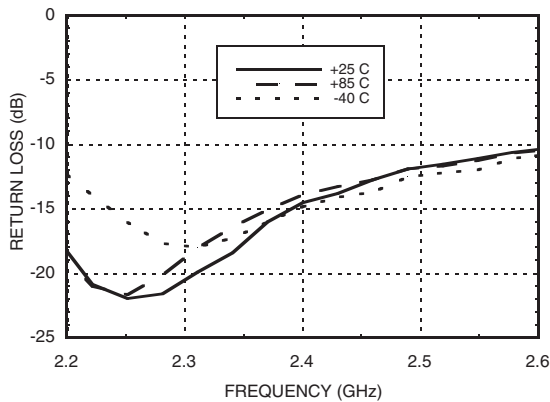
**Gain vs. Temperature**



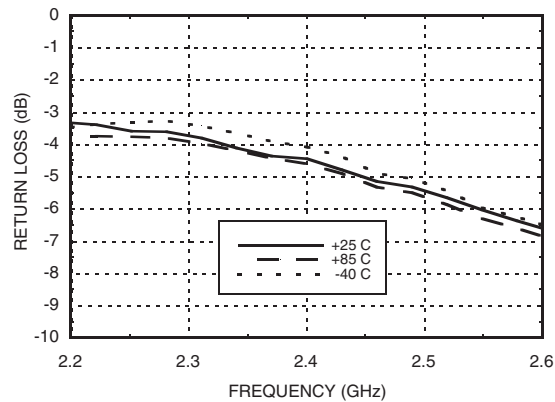
**Noise Figure vs. Temperature**



**Input Return Loss vs. Temperature**



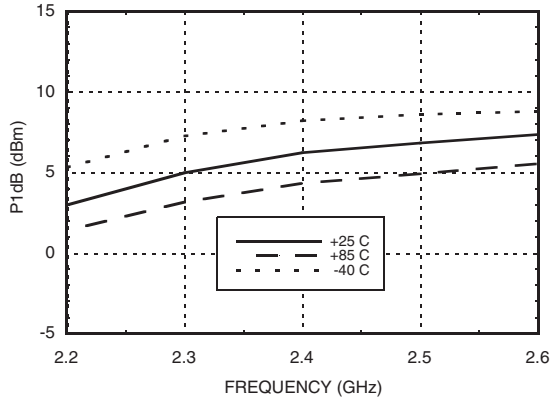
**Output Return Loss vs. Temperature**



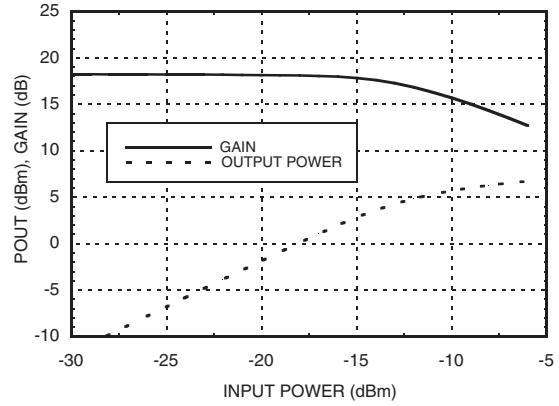


**GaAs MMIC LOW NOISE  
AMPLIFIER, 2.3 - 2.5 GHz**

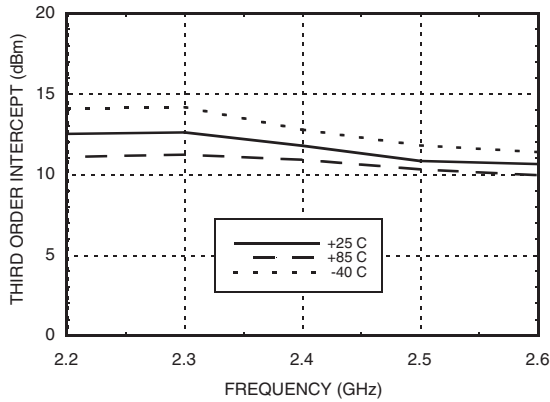
**Output P1dB vs. Temperature**



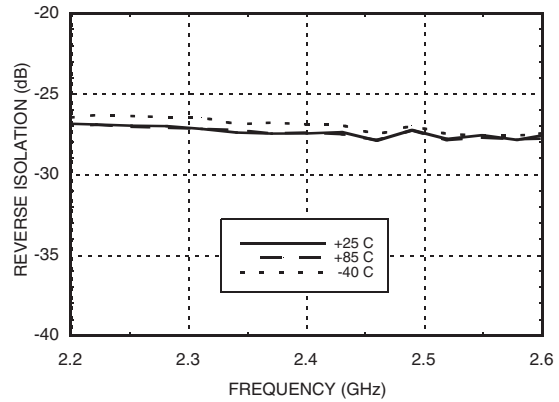
**Power Compression @ 2.4 GHz**



**Output IP3 vs. Temperature**



**Reverse Isolation vs. Temperature**



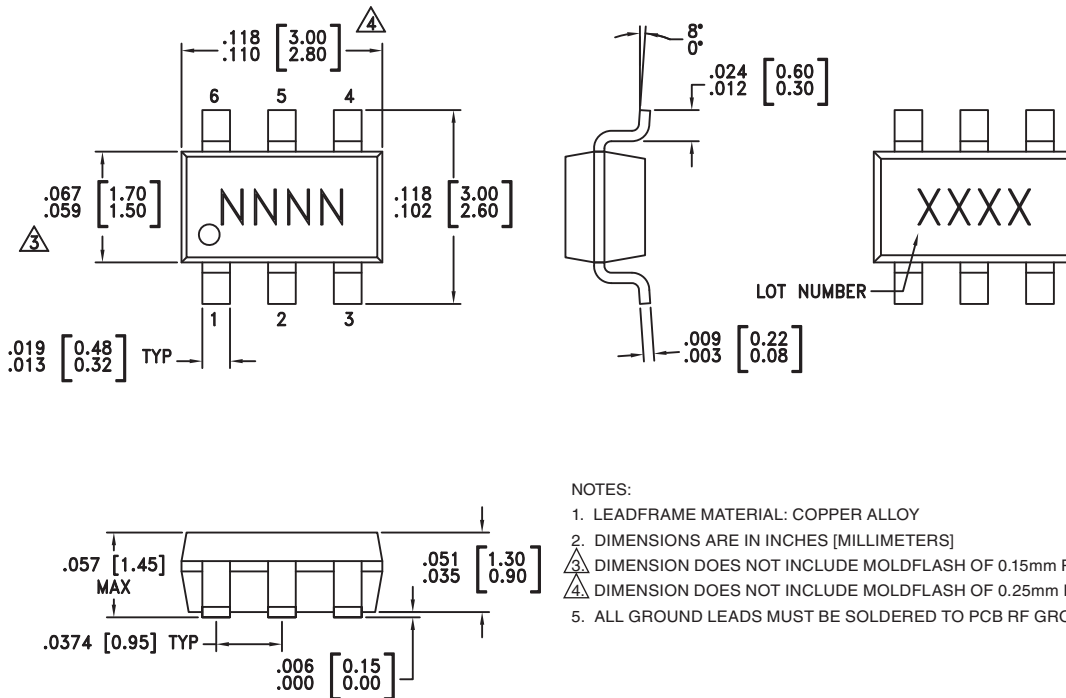
### Absolute Maximum Ratings

Drain Bias Voltage (Vdd)	+7 Vdc
RF Input Power (RFIN)(Vdd = +3 Vdc)	0 dBm
Channel Temperature	150 °C
Continuous Pdiss (T = 85 °C) (derate 6.35 mW/°C above 85 °C)	0.413 W
Thermal Resistance (channel to lead)	157 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
ESD Sensitivity (HBM)	Class 1A



ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS

### Outline Drawing



### Package Information

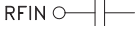

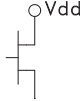
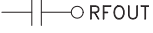
Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking <sup>[3]</sup>
HMC286	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 <sup>[1]</sup>	H286 XXXX
HMC286E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 <sup>[2]</sup>	286E XXXX

[1] Max peak reflow temperature of 235 °C

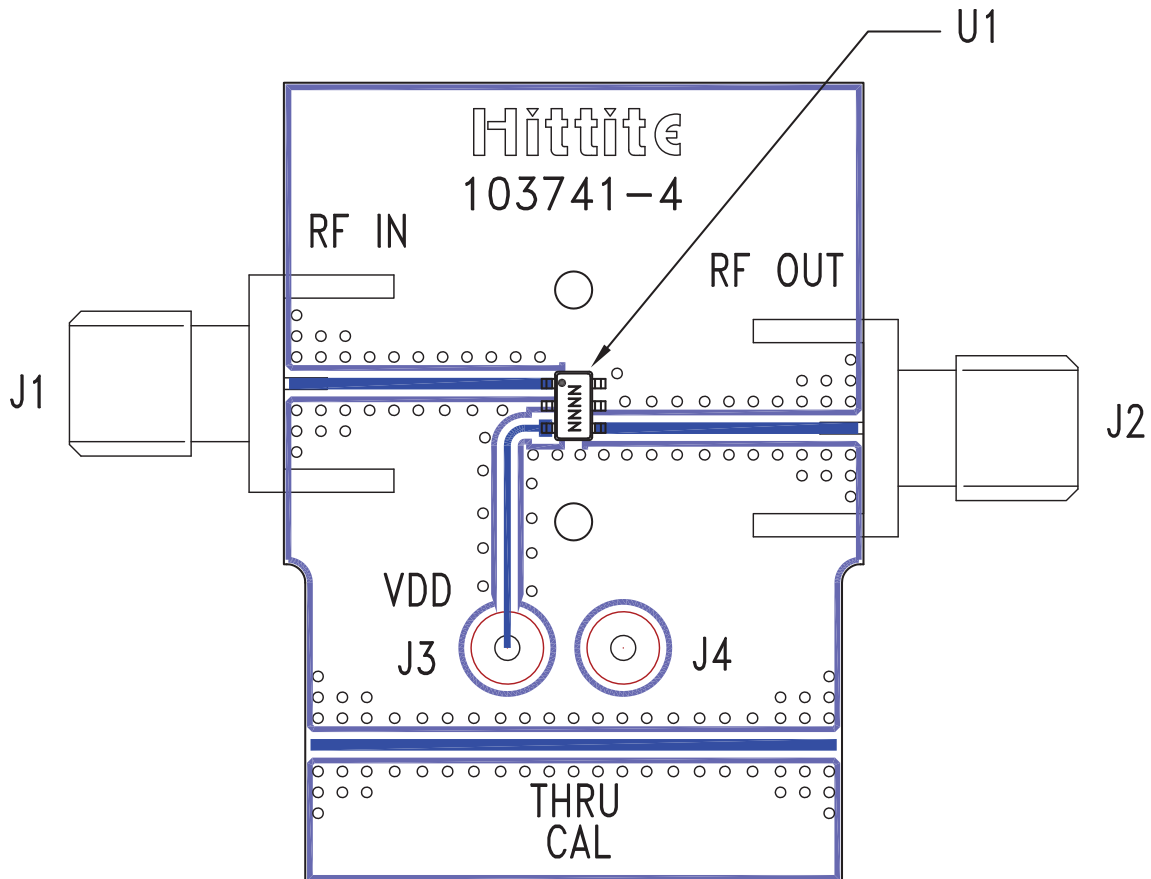
[2] Max peak reflow temperature of 260 °C

[3] 4-Digit lot number XXXX

**Pin Descriptions**

Pin Number	Function	Description	Interface Schematic
1	RFIN	This pin is AC coupled and matched to 50 Ohms.	RFIN 
2, 5, 6	GND	These pins must be connected to RF/DC ground.	
3	VDD	Power supply voltage.	
4	RFOUT	This pin is AC coupled and matched to 50 Ohms.	

**Evaluation PCB**



**List of Materials for Evaluation PCB 103743<sup>[1]</sup>**

Item	Description
J1, J2	PCB Mount SMA Connector
J3, J4	DC Pin
U1	HMC286 / HMC286E Amplifier
PCB [2]	103741 Evaluation PCB

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Roger 4350

The circuit board used in the application should use RF circuit design techniques. Signal lines should have 50 Ohm impedance while the package ground leads should be connected directly to the ground plane similar to that shown above. A sufficient number of via holes should be used to connect the top and bottom ground planes. The evaluation circuit board shown is available from Hittite upon request.